

Marine Resource Bulletin

A Sea Grant Advisory Service

Vol. IX, No. 4

VIMS, July/August 1977

BOATING SAFETY SERVICES FROM NOAA

WEATHER RULES FOR SAFE BOATING

Before setting out:

1. Check local weather and sea conditions.
2. Obtain the latest weather forecast for your area from radio broadcasts.

When warnings are in effect, don't go out unless you are confident your boat can be navigated safely under forecast conditions of wind and sea. Be cautious when you see warning displays at U.S. Coast Guard stations, yacht clubs, marinas, and at other coastal points.

While afloat:

1. Keep a weather eye out for:
the approach of dark, threatening clouds, which may foretell a squall or thunderstorm; any steady increase in wind or sea; any increase in wind velocity opposite in direction to a strong tidal current. A dangerous rip tide condition may form steep waves capable of broaching a boat.
2. Heavy static on your AM radio may be an indication of nearby thunderstorm activity.
3. Check radio weather broadcasts for latest forecasts and warnings.
4. If a thunderstorm catches you afloat:
---stay below deck if possible.
---keep away from metal objects that are not grounded to the boat's protection system.
---don't touch more than one grounded object at the same time (or you may become a shortcut for electrical surges passing through the protection system).

As the recreational boating population increases, so may boating accidents, injuries, and property loss. To help prevent this situation, the National Oceanic and Atmospheric Administration (NOAA) provides up-to-date nautical charts and weather information year round.

NOAA staff has recently completed an improved color format for all new nautical chart editions. The new format, devised by the National Ocean Survey, begins with the metric version of the prototype Lake Erie Chart 14820 and has been used on all new chart editions since January. With the new colors, boaters can more easily distinguish between land and water and can better determine low water areas when viewed at night under 'red light' illumination.

NOAA Weather Radio was established in the 1960's by the National Weather Service to provide marine weather forecasts and warning to recreational boaters. The network now numbers about 135 VHF-FM stations nationwide, and is expected by 1980 to total over 300 stations capable of serving about 90% of the U.S. population.

Along coastal areas, NOAA Weather Radio is on the air continuously, repeating taped weather messages every four to six minutes, 24 hours a day, seven days a week. Tapes are updated periodically, usually every two to three hours, and are also revised to meet fast-changing weather. Special receivers or tuners are required since the weather forecasts are made on 162.40, 162.475, and 162.55 megahertz which are considerably above the frequencies used for commercial FM broadcasts. Effective broadcast range is about 40 miles, but this varies somewhat, depending on the terrain and quality of receiver.

In addition to providing weather reports 24 hours a day, NOAA Weather Radio offers a variety of specialized weather information tailored to the needs of listeners in each area. Stations along the seacoasts and Great Lakes provide forecasts for boaters, fishermen, surfers and others engaged

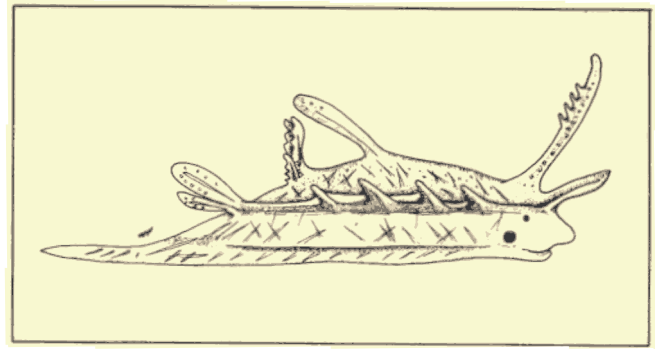
in marine activities. River forecasts are given where flooding or waterway navigation are important.

As a supplement to NOAA Weather Radio, the U.S. Coast Guard broadcasts the National Weather Service's forecast four times a day from stations strategically positioned on the Nation's coastline.

In a further effort to promote boating safety, NOAA makes available three publications: *National Ocean Survey Publications for Safe Navigation* is a free folder describing various types of nautical charts, maps, and related publications, and how to order them. Write to Distribution Division (C44), National Ocean Survey, Riverdale, MD 20840.

Marine Weather Services describes some of the marine weather products and displays of NOAA's National Weather Service. It gives a check-list of weather rules for safe boating, and lists marine weather services charts and tells how to order. For sale for \$.25 each by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Nautical Chart 2 (So You Bought A Boat!) is a 44-page booklet containing useful information on how to avoid trouble in a boat and, in some cases, how to get out of trouble. It has chapters on the nautical chart, use of fishing instruments for navigation, and radio, weather, compass, piloting, rules of the road, boat lights, the anchor, and charting products. Available for \$1.00 each from Distribution Division (C44), National Ocean Survey, Riverdale, MD 20840.



This nudibranch, Okenia cupella, is white with dark spots and about one-eighth inch long. It is found during the winter months in the lower Chesapeake Bay, the York River, and the Eastern Shore. It feeds on bryozoans (moss animals).

STUDENTS IN MARINE SCIENCE

Editor's note: Nautical charts may be ordered from the Distribution Division C-44, National Ocean Survey, Riverdale, MD 20840. NOAA Weather Radio for the Chesapeake Bay area is KHB37, 162.55 megahertz. Twenty-four hour recorded weather broadcasts may be heard by telephoning (804)853-3013. From 6:00 a.m. to 6:00 p.m. specific questions will be answered after the broadcast.



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ANN GREER

EDITOR

Marine Resource Bulletins are produced by the Virginia Institute of Marine Science as a Sea Grant Advisory Services project. Subscriptions are available without charge on written request to the editor.

William J. Hargis, Jr. Director

Most nudibranchs are one inch long or less, so during much of the laboratory research Ms. Vogel used a microscope. She observed the often times elaborate mating activity and egg laying. When the eggs are hatched, the snails swim and have shells. Then they settle on a piece of food and lose their shell. One species even casts off its shell in the egg. Nudibranchs are more advanced than their relatives with shells, thus the shell stage is thought to repeat the evolutionary process.

Shell-less snails fight with each other, and in some cases the battle ends with a meal for a cannibalistic species. Nudibranchs have specific feeding preferences which affect their physical characteristics. For example, an orange nudibranch found in the Bay area feeds on an orange sponge. Feeding preferences also help determine which nudibranchs are found in certain areas. Different species eat jellyfish, hydroids, and even the Portuguese man-of-war.

Since nudibranchs have no hard shell for protection, they have developed a variety of defense mechanisms. Some snails are brightly colored to act as a warning to other animals, while others are camouflaged by their color. Some nudibranchs secrete sulphuric acid which repels fish. The food nudibranchs eat sometimes aids in their defense; some species burrow into their food for protection, while others transfer the stinging cells of other animals to themselves for later use.

Nudibranchs benefit man indirectly through their participation in the marine food web, and they are a colorful addition to the marine environment. If you would like to learn more about shell-less snails and see color photographs of many species, write for *Nudibranchs* by T.E. Thompson, T.F.H. Publications, Inc., 211 West Sylvania Ave., Neptune City, NJ 07753.

A CLOSER LOOK...

AT THE DEPARTMENT OF MICROBIOLOGY-PATHOLOGY

Marine science is not all whales and mammoth underwater mountains. At the other end of the size spectrum are the bacteria, fungi, protozoa, and algae which are part and parcel of the marine community.

These microorganisms which cause diseases and participate in other biological processes in estuaries and oceans are the focus of research in the Department of Microbiology-Pathology. Twenty-five scientists, technicians, and graduate students work in the department, which is approximately 15 years old.

Much of the work done by the staff involves the study of diseases in marine life. Using instruments like the electron microscope, researchers learn the unique characteristics and structure of a disease organism. They can then take advantage of existing veterinary and medical literature to identify chemical compounds which may be used to combat the disease. For example, antimalarial drugs are being tested for use on oyster disease.

Other biological processes are also studied. With National Science Foundation funding, scientists are working to identify plankton in estuaries which are engaged in photosynthesis. This research will help determine the worth of an estuary and provide a foundation of knowledge to assess future plankton populations. Many plankton are so small that they haven't been studied in detail until now. With the electron microscope, scientists can see what those plankton look like and how to identify them. In the VIMS study researchers are looking at about 400 species, and they plan to write a book on what species are found in the Chesapeake Bay.

Much of the work done in the department is

designed for use in restricted bodies of water, such as in aquaculture or to clean oysters for interstate or international shipment. For example, department scientists had a major role in designing holding tanks and procedures for the depuration, or self-cleansing, of oysters. The staff took bacterial counts and helped design experiments to test the tanks for water flow and to determine the best handling procedures for oysters.

In the department's bacteriology section, scientists are analyzing hydrocarbon breakdown by bacteria in marshes and open oceanic water. They are studying the types of bacteria which can break down hydrocarbons and the rates and conditions at which it occurs. This information could lead to understanding the role of bacteria in the breakdown of oil spills. Bacteriology staff are also studying the effects of industry on bacterial levels in estuaries to see if industrial plants allow for unusual growth of organisms in the surrounding water.

The department's parasitology staff studies the taxonomy and structure of parasites in fish. One current study deals with whether or not certain lobster parasites cause mortalities. Scientists in this section analyze parasites on specimens which are brought in by watermen, fishermen, and aquarists. This free service is also used by the State Water Control Board when fish kills occur.

Other research includes taking fish from rivers to see if kepone results in pathological conditions in fish, and studying the diseases and pathological states of organisms on the outer continental shelf by looking at tissue sections. Current levels of disease are being analyzed to help assess the impact of future offshore oil development.

OIL IN THE MARINE ENVIRONMENT

During the past few decades, the United States increasingly has relied on crude oil to supply our expanding energy needs. The marine environment often suffers from this reliance when oil is recovered, transported, and used. Just what do we know about this all-important hydrocarbon?

The amount of oil reaching the sea has been estimated at from one to ten million metric tons per year. The most probable rate is near the middle of this range. Most of the spills are small, continuous doses from tanker operation, industrial discharge, and onshore waste disposal.

Oil affects marine organisms in two ways: it can be toxic like acid or chlorine and kill the organism, or it can interfere with the organism's sensory capabilities, its reproduction, or its feeding habits. For example, some lobstermen soak bricks in kerosene which draws lobsters to feed. The kerosene mimics a chemical stimulus that is not well understood at present.

Oil may either coat the organism or cover its environment. If heavy oil physically coats a plant or an animal, it usually increases the organism's temperature because it is black and absorbs heat. It can also prevent an animal from moving. If, on the other hand, oil covers a large area it changes the environment and affects behavior. For instance, many times oysters will not set in areas where oil spills have occurred.

The effect a spill has depends on several factors -- the time of year; the type and amount of oil; and the type of environment, such as marsh,

sand beach, or open sea. When oil is spilled, some of it floats and is distributed by winds and tides. It can also become dispersed through the water column, where as it sinks some oil is dissolved and some is absorbed by sediment.

There are three primary methods of cleaning spills. Despersants dissolve oil but are sometimes more toxic than the hydrocarbon itself, so the U.S. has generally avoided this means. Physically removing the oil is another way to handle a spill, such as mowing a marsh or adding straw to a spill to absorb it. High pressure water or steam may be used for the cleanup, but both methods may destroy organisms in the cleaned area. Sometimes, if the oil is floating, skimming or vacuum devices may be used.

VIMS scientists in the Department of Ecology Pollution have been conducting research on oil spills and their effects for several years. Work has been done on the evaporation, dissolution, and movement of surface oil slicks; the reaction of clams and oysters to oil spills; the incorporation of oil into marshes -- how it affects animals and plants, and how it is absorbed by sediment; and the effects of oil on the environment over an extended period of time. Researchers are also involved in the extensive VIMS study for the U.S. Bureau of Land Management. They are compiling background data on levels of hydrocarbons on the Middle Atlantic continental shelf so that future offshore oil drilling may be better assessed.



Educators are constantly seeking ways to trigger student motivation, to discover new methods and materials in teaching, and to maintain relevancy in what is taught. The waterways of the world and man's relation to them provide mystery and excitement for a large cross section of the population. If properly planned and used, marine subjects can enliven and enhance the entire educational process.

So you're convinced. Now, how do you go about finding these marine materials?

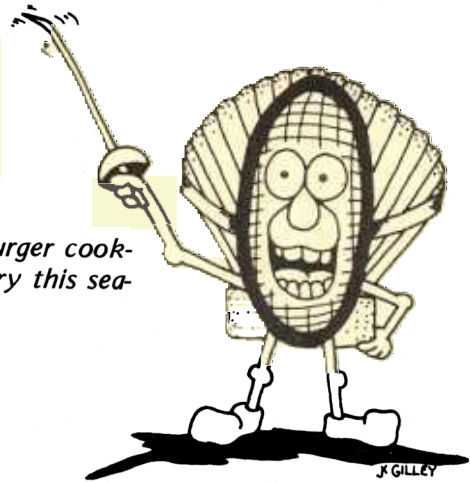
The VIMS Sea Grant Marine Education Center has been established this year for just such a purpose. The center is designed to assist teachers from kindergarten through college in integrating marine-related units into their existing subject area, wheth-



The VIMS Sea Grant Marine Education Center provides films, publications, and a study area for teachers and other interested persons.

THE FISH HOUSE KITCHEN

Are you under the impression that hot dog and hamburger cook-outs are all you have to look forward to this summer? Try this seafood recipe on the grill for a change of pace.



SCALLOP KABOBS

- 1 pound scallops, fresh or frozen
- 1 can (13½ ounces) pineapple chunks, drained
- 1 can (4 ounces) button mushrooms, drained
- 1 green pepper, cut into 1-inch squares

- ¼ cup salad oil
- ¼ cup lemon juice
- ¼ cup chopped parsley
- ¼ cup soy sauce
- ½ teaspoon salt
- Dash pepper
- 12 slices bacon

Thaw frozen scallops. Rinse with cold water to remove any shell particles. Place pineapple, mushrooms, green pepper, and scallops in a bowl. Combine oil, lemon juice, parsley, soy sauce, salt, and pepper. Pour sauce over scallop mixture and let stand for 30 minutes, stirring occasionally. Fry bacon until cooked but not crisp. Cut each slice in half. Using long skewers, alternate scallops, pineapple, mushrooms, green pepper, and bacon until skewers are filled. Cook about 4 inches from moderately hot coals for 6 minutes. Turn and cook for 4 to 6 minutes longer. Serves 6.

Cont. from Page 4

er it be science, languages, music, or industrial arts. Other persons who may find the center's services helpful are also welcome.

A teacher may visit the center Monday through Friday from 8 a.m. to 4:30 p.m. It is equipped with a variety of curriculum guides, unit plans, classroom aids, field guides, laboratory manuals, and film and book lists. Numerous pamphlets and publications on marine topics are available at little or no charge. The audiovisual library contains 16 mm films, slides, filmstrips, records, and filmloops. The films may be taken out on loan for a minimal fee. Study carrels are provided for use of materials in the center, and the VIMS education staff is available for guidance.

In addition to developing this resource center, VIMS, with assistance from the National Sea Grant Program, is devising a national Marine Education Materials Systems (MEMS) for the collection, storage, retrieval, and dissemination of marine education materials. There are numerous marine education materials in existence, but many of them

are not readily available. MEMS will make it easier to retrieve these hard-to-find materials. This collection system will also provide a basis for determining the areas of greatest need for the development of new materials. MEMS will eventually be computerized to facilitate the retrieval of requested materials.

Marine education is easily integrated into the educational process and can add strength to the curriculum and provide new tools for the teacher. If you would like more information about the Marine Education Center or MEMS, contact:

Susan Gammisch or Jim Lanier
VIMS
Gloucester Point, VA 23062
804/642-2111



ADVISORY STAFF CONDUCTS CAMP

VIMS marine advisory personnel served as the staff for a one-week marine studies camp in August. The camp, sponsored by the Virginia Wildlife Federation, was held at the VIMS Wachapreague Laboratory on the Eastern Shore.

The aim of the project is to make students from 13 to 18 years old aware of the marine environment and its resources. Twenty-eight students were selected from 230 applications in a statewide competition. The students were housed in dormitories at the Eastern Shore Lab. The instructional program devised by the advisory staff included surveys of marine life and visits to the barrier islands and a marshland sanctuary.

The Virginia Wildlife Federation hopes to make the marine studies camp a yearly event.

NEW ASSOCIATION PROMOTES MARINE EDUCATION

The National Marine Education Association (NMEA) was formed recently to improve marine literacy at all educational levels and to stimulate communication among educators and persons with an interest in marine environments. The NMEA publishes as its principal medium of communication the *Journal of Marine Education*, and holds an annual national conference. The local and regional dissemination of marine-related teaching materials is emphasized in the organization's activities. Yearly dues of \$15.00 include a subscription to the *Journal of Marine Education*. For further information contact Thayer Shafer, Executive Secretary, NMEA, 546B Presidio Blvd., San Francisco, CA 94129.

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